

# DEVELOPMENT OF INTERMODAL TRANSPORT AND LOGISTICS SCHEMES FOR PASSENGER TRANSPORTATION BY RAILWAY TRANSPORT WITHIN UKRAINE-EUROPE DIRECTION

## РАЗРАБОТКА ИНТЕРМОДАЛЬНЫХ ТРАНСПОРТНО-ЛОГИСТИЧЕСКИХ СХЕМ ДОСТАВКИ ПАССАЖИРОВ ЖЕЛЕЗНОДОРОЖНЫМ ТРАНСПОРТОМ В НАПРАВЛЕНИИ УКРАИНА – ЕВРОПА

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**Abstract:** *The main issues are considered in this topic: the new logistic schemes for passenger transportation between Europe and Ukraine; the developing an integrated short-term planning system for the purpose of interaction between passengers and carriers; the intermodal transportation of passengers.*

**KEYWORDS:** INTERMODAL PASSENGER TRANSPORTATION, RAILWAY TRANSPORT, PASSENGER LOGISTICS, PASSENGER TRAFFIC.

### 1. Introduction

The logistics of passenger railway transportations is a complex and interconnected solution of problems in organization of passenger transportation. The objective of logistics management of passenger rail transportation system is a transfer of a passenger from the station of departure to the station of destination ensuring the optimization of the following criteria: effective use of rolling stock and rail infrastructure, minimal costs, optimal route, traffic schedule and the level of transportation quality. A modern passenger became more demanding – the requirements to the quality of transportation, comfort and convenience, the interaction of different transport routes and directions, the quality and range of associated services, the way of the fare payment, the direct and high-speed transit to the places of destination increased have been increased.

Management, based on the principles of logistics in passenger railways sector, is directed at the optimization of costs for transport services while increasing their quality and competitiveness. Currently, the logistics measures of railway passenger sector management include [1]:

- transit from information to information-analytical systems of transportation process management;
- the establishment of high-speed passenger corridors;
- the introduction of additional routes or additional cars in areas where there is a steady demand for transportation;
- optimal organization suburban traffic;
- the introduction of a single travel document for all kinds of passenger transportation;
- the elaboration of options of logistic chains to transfer passengers by railway;
- technical and economic evaluation of options to transfer passengers on each section of logistics system;
- the assessment of transport service quality according to transportation options;
- the creation of virtual information and logistics centers;
- the completion of existing information systems for tracking the terms of travel documents realization and obtaining timely information as to the profitability of each train;
- the search for new market niches related to the production of goods or the provision of specialized services in order to attract workers and manufacturing capacities of Railways released during the reformation process in the sector.

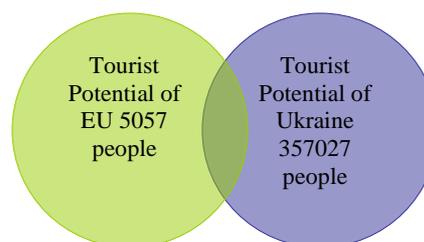
Currently the management of passenger rail transportation based on logistics has already taken place in a Public joint-stock company «Ukrzaliznytsia». Thus, the audit of passenger traffic on each train on the basis of the introduced information system has enabled the Railways of Ukraine to undertake a number of activities to reduce of unprofitableness of passenger traffic, such as the

replacement of suburban trains by rail buses on not intensive sections, the replacement of passenger trains by high-speed passenger trains, accelerated regional trains and high-comfort trains, and the abolishment of unprofitable sparsely populated trains etc.

The improvement of logistics approaches to the management process in passenger railway transport sector will put them to a new level and will ensure the growth of competitiveness of passenger transportation.

### 2. Problem discussion

Recently the passenger turnover between Europe and Ukraine is increasing in leaps and bounds, and this fact is a stimulus for transport companies of Ukraine to create new logistic schemes for passenger and tourists transportation (fig. 1) [1].



**Fig. 1.** Ukraine tourism potential model for calculating the prospective demand for intermodal passenger tourists by train

The most attractive for residents of Ukraine is tourism in European Union (EU) countries in northern and central Europe, in particular, the Baltic countries, Czech Republic, Slovakia, Hungary, Romania. Particular urgency tourist visits aforementioned countries takes in connection with the citizens in 2017 year Ukraine visa-free travel to the EU, and therefore the expected sharp increase in demand for international tourism from Ukraine to neighboring states.

The undeniable advantage of railway tourism (versus bus) is reliability, comfort and the possibility to navigate in all weather conditions travel by rail, which allows any season easily to transport tourists between cities visits mostly at night, providing quality recreation and meals on the go.

For tourists from Ukraine can become the most attractive areas: Ukraine – Poland – Baltic countries – Ukraine, Ukraine – Poland – Central Europe – Ukraine (fig. 2).



**Fig. 2.** The most attractive areas for tourists from Ukraine to Europe

Besides, it is very important to develop an integrated short-term planning system for the purpose of interaction between passengers and carriers. The main point under creation of an intermodal system for passenger transportation is good organization, which influences in direct proportion to the quality of services. That is why it demands constant implementation of new technologies. The main problem solved by the intermodal transportation of passengers is the creation of an optimized travel due to transfer from one mode of transport to another one. Passengers who do not have a direct route with no transfer may need it, or it can be used by travelling tourists.

Public joint-stock company «Ukrzaliznytsia» is interested in the cooperation with other modes of transport and countries, and also in the development of the railway tourism, which is proved by the approved strategies of development. The creation of intermodal (transportation of passengers by different modes of transport with liability imposed on one operator) schemes for passenger transportation acts as an essential innovation of the transport area. The main goal of modern intermodal passenger transportation is minimization of private cars usage by the population and attraction of potential passengers to the public transport. The participants of intermodal logistic scheme within Ukraine-Europe direction are railway, air, road modes of transport and ferries as well (fig. 3).

Thus, the intermodal transport system represents integration of some modes of transport where, in most cases, the basic one, nevertheless, is the railway transport. The railway transport acts as the master link of the intermodal system because it is closely situated to other transport junctions of every city.

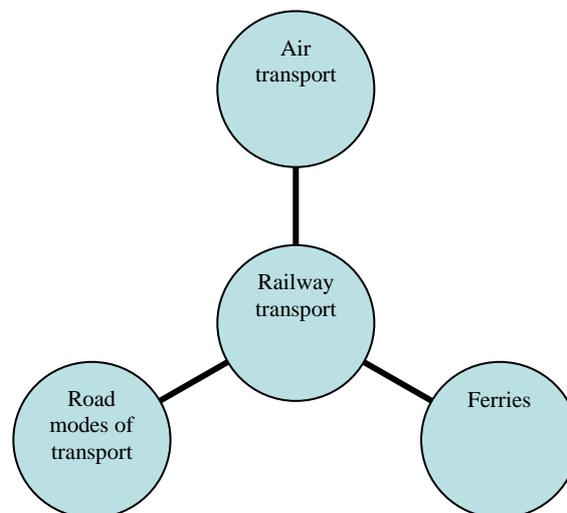
Passenger intermodality is a policy and planning principle that aims to provide a passenger using different modes of transport in a combined trip chain with a seamless journey [2].

Intermodality can be seen as a characteristic of a transport system that allows at least two different modes to be used in an integrated manner in a door-to-door transport chain. The adjective intermodal can be used for a service, facility, consignment of journey, involving transference between different modes of transport. Moreover, intermodal travel necessarily involves transferring from one mode to another. This usually takes place at modal interchanges.

The focus of this project is on long-distance passenger intermodality (journeys >100 km), including also the «first/last urban mile» (the connection with the regional and urban transport system) [1]. The strategic objectives of this research were:

- to support a more favourable environment for intermodal passenger travel across Europe;

- to foster the integration of intermodality policies for passenger travel;
- to facilitate cooperation to implement intermodal solutions;
- to overcome the fragmentation of the current transport market.



**Fig. 3.** The participants of intermodal logistic scheme within Ukraine-Europe

To achieve these objectives three main tasks had to be studied [2]:

- exchange to build a European network for intermodal passenger transport to exchange experience and work on better (transnational) solutions;

- transfer to set up a knowledge centre for intermodal passenger transport which structures research, defines research questions, formulates policy recommendations and disseminates information;

- promotion to promote passenger intermodality across Europe, mobilize political support, activate stakeholders and eventually develop a long term perspective for the project as an active organization to make sure every objective and task was treated to its full complexity. Three main work areas were defined.

One of the Examples National Projects is Effective terminals for intermodal transports in Sweden [3]. The objectives of the project are to develop intermodal transshipment centres with respect to sustainability and efficiency in cargo handling in the terminal and towards connecting transport systems by sea, rail and road.

This being clear, there are a few related concepts and issues which may blur newly built picture about intermodality. In some texts, policy documents or other sources we might come across some concept that is closely related or even worse, that is wrongly used to point at intermodality. So listed them below and gave a definition for each of them.

Interoperability – capability to operate on any stretch of the transport network (especially crossborder) without any difference (regulatory, technical and operational systems need to be compatible) [2].

Intermodal transport – transport using different elements of a modal subsystem (requiring their cooperation) [2].

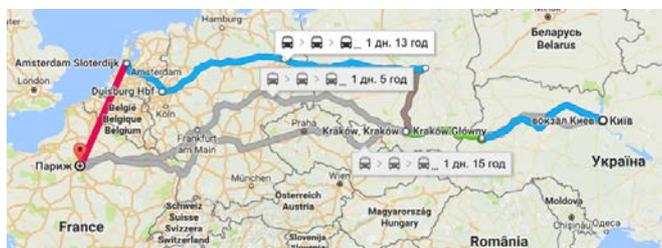
Multimodal – use of different modes of transport at different opportunities (trips/trip chains); policy principle not to stick to one single mode. The development of a seamless web of integrated transport chains, linking road, rail and waterways. Such integration would lead to improved flexibility, quality and cost effectiveness and would stimulate competition between transporters instead of between transport modes.

So, one of the most popular routes by railway transport within Ukraine-Europe direction is Kiev – Berlin – Hamburg – Paris (fig. 4) under questioning of 983 respondents that was conducted in 2016 year. On this route we can unite train and bus in intermodal transportation. The main idea was in using single travel document and implemented by a single company – Public joint-stock company «Ukrzaliznytsia». On fig. 4 red color was using for train direction and green color – for bus direction.



**Fig. 4.** The example of intermodal transport and logistics schemes for passenger transportation by railway transport within Ukraine-Europe direction

Also was analyzed route Kiev – Krakow – Amsterdam – Paris (fig. 5). There is combine also train and bus directions. On fig. 5 crimson and green colors was using for bus direction and blue and gray colors – for bus direction.



**Fig. 5.** The route of intermodal transport and logistics schemes for passenger transportation by railway transport within Ukraine-Europe direction

### 3. Conclusion

Due to the analysis of passenger railway traffic condition it has been grounded that the introduction of modern logistics management gives the opportunity to invest funds in new rolling stock at the expense of obtained revenues, to improve the quality of services and to refuse cross-subsidization of passenger transportation at the expense of freight transportation [4]. The methods presented in this work allow improving not only the efficiency of the technology of passenger train operation organization [5] but getting the highest profit possible from this kind of activity at the expense of reducing cost price.

While creating the intermodal system it is important to have online software products for the transfer of information and its correction in online regime. Besides, the essence of intermodal transportation lies in the fact that it is put into practice with a single travel document and implemented by a single company, which is more profitable both for passengers and carriers. Thus, we see implementation of the business-strategy «win-win».

### 4. Literature

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